Avionics/Intelligence and Electronic Warfare Bulletin

(Formerly the "ARAT Bulletin")

AN/APR-39A(V)2 : Coming to a Fleet Squadron Near You!

With much anticipation, the AN/APR-39A(V)2, both a Radar Signal Detection Set and an Electronic Warfare Suite Integrator [the APR-39A(V)2 is the heart of the USN/USMC ASE Suite: APR-39A(V)2, AAR-47 Missile and soon-to-be Laser Warning System, and the ALE-47 Countermeasures Dispensing System], will make its debut this summer with initial installations in Fleet UH-1N Iroquois squadrons in the United States Marine Corps. Deployment with the system, installed on the venerable "Huey," should occur in the Fall of this year. This deployment – and subsequent ones – will be much less of a burden to the Fleet, as the system's operational software is now **UNCLASSIFIED.** This enhancement is a result of National Security Agency (NSA) and Defense Threat Reduction Agency (DTRA) approval of the encryption algorithm inherent in the APR-39A(V)2.

As the UH-1N undergoes installation of the APR-39A(V)2 this summer, its "sister platforms," the AH-1W, HH-60H, CH-53E, and KC-130 F/R/T, will be conducting Follow On Test and Evaluation (FOT&E) Operational Test (OT) to determine both the effectiveness and suitability of the system, *as installed* on the respective platforms (this was already accomplished on the UH-1N when the system passed Operational Evaluation [OPEVAL] in 1996). This subject FOT&E (OT) will take place at Naval Air Station (NAS) China Lake, CA, and is scheduled to commence in mid-July. The MV-22B is evaluating the APR-39A(V)2 as a part of the entire aircraft's OPEVAL.

In This Issue

In preparation for a successful fielding of the system, the Army Reprogramming Analysis Team-Threat Analysis Center (ARAT-TA) has crafted an "Echo Range +" Mission Data Set (MDS) to facilitate testing on ranges as geographically diverse as the Eglin Test Range (Eglin AFB, FL) and the Echo Test Range (NAS China Lake, CA). Additionally, ARAT-TA and CECOM SEC have been busy crafting the first of ten real-world, geo-tailored threat MDSs.

In the true spirit of an Integrated Product Team (IPT), detailed Operator and Maintainer training was created and presented to both aircrew and maintainer alike – before the actual fielding of the system. This was accomplished, in part, via training provided by the contractor (Litton Advanced Systems, Inc.). Additionally, videotapes of this training – as well as the associated publications – were mailed to the respective weapons schools, Groups, and Squadrons in the Department of the Navy (DoN) to facilitate training

From the Senior Editor's Desk

Written by Mr. Joseph Ingrao, Deputy Chief (A)

Speed as a winning Strategy

Remember the tale of the tortoise and the hare? Well, in today's intense warfighting operations, we have concluded that the hare wins hands down. In other words, the strategy of speeding software and system upgrades to the field is now a necessity if we want to maintain the best fighting force in the world. Military organizations that introduce a rapid succession of new products often have a reputation for "state-of-the-art" innovation. They tend to stay one step ahead in terms of technology leadership and quality. Personnel in such organizations embrace the philosophy of speed and innovation. They abhor bureaucracy and move quickly by making fast decisions on the their own.

There are two areas where the A/IEW Division has applied speed as a strategy: innovation and distribution. The first is moving new software to the field quickly. This entails streamlining the software planning process to shorten the period between the initial conception of an idea and when it reaches the field. The focus here is on new software and ideas.

The other area where speed plays a strategic role is in the flow of existing information through channels of distribution. We have adopted standardized systems that can speed the flow of information among channel members and accelerate production and delivery schedules. The final result is that it takes less time for existing software and information to go from developer to the field user.

AN/APR-39A(V)2 (cont.)

to those units that could not physically attend the training sessions at Litton in San Jose, CA.

By way of specific operator training, StarMedia, Inc. created an interactive, computer-based, CD training program entitled, "ASE Suite 2.0." This CD, which is currently being mailed-out to the Fleet (again, before actual system deliveries), will afford aircrews the opportunity to "fly", virtually, their ASE Suite – tailored *exactly* to their platform.

All of the efforts mentioned above would not have resulted in the high quality deliverables had it not been for the welcomed inclusion of the Testing Community (VX-9, VX-1, and HMX-1), the Naval Weapon Schools (Marine Aviation Weapons and Tactics Squadron – 1 and Naval Strike Air Warfare Center), and, of course, the Fleet aviator and maintainer.

Subsequent issues of the "A/IEW Bulletin" will host articles detailing the results of the upcoming FOT&E (OT) and continuing efforts to provide the best ASE Suite to the Fleet!


Written by the Maj. Matt Smith-Meck, DPM USMC Programs

Intelligence Fusion Systems and Field Software Services Support

Tomorrow's Tools for Today's Warfighter

Introduction

The challenge for the Intelligence planners of the 21st Century is integrating future software support for the Warfighter without inhibiting mission execution. Today's Warfighter relies on sophisticated Intelligence and Electronic Warfare (IEW) Fusion systems to provide real-time combat information. The IEW mission-critical functions (i.e., collection, processing, analyzing, dissemination) must be consistently reliable, available, and maintainable throughout their life cycle.

The U. S. Army Communications-Electronics Command (CECOM), Software Engineering Center (SEC), Intelligence Fusion Systems (IFS) Field Support Organization is widely recognized within the U.S. Army Intelligence community for excellence in the area of global on-site field software support. Recognizing the unique support requirements of Mission Critical Computer Resources (MCCRS), IFS established Field Software Services Support (FSSS), a global network of highly qualified software engineers. FSSS is a key component of the U.S. Army Life Cycle Support (LCSS) concept and is structured to support the All Source Analysis System (ASAS) family of systems, Digital Topographic Support System (DTSS), Integrated Meteorlogical System (IMETS), and Trusted Workstation (TWS).
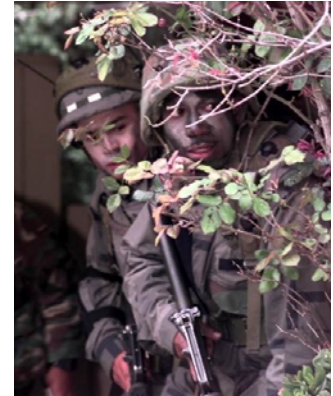
Overview

FSSS provides an innovative field software support process for the Program Executive Officers (PEO) and Program Managers (PM) with FSSS. After the PEO/PM system fielding, Post Production Software Support (PPSS) corrects latent software errors and integrates Configuration Control Board (CCB)-approved software enhancements into the Army baseline software to meet systems' mission requirements. The FSSS provides a cost-effective mechanism to implement these software enhancements for the user in the field.

By providing maintenance support at the Organizational, Direct Support (DS), General Support (GS), and Depot levels, the IFS software maintenance process parallels the Army's four-level software support concept. The FSSS provides direct organizational software maintenance through on-site FSSS engineers at echelons both above and below Corps.   FSSS engineers at Regional Software Support Activity (RSSA) deploy in DS roles based on operational needs and provide GS maintenance on a regional basis. Depot-level software support is provided from the maintenance facilities at Ft. Huachuca, AZ.

FSSS engineers provide software service support to the U.S. Army and execute the principle of *"timely support as far forward as possible"*.

The FSSS software troubleshooting is a multi-tiered process that emphasizes problem resolution and repair of software at the lowest level. For remote sites, the first attempt to solve a user problem is made through voice communication; the FSSS engineer attempts to talk an operator through the problem. If that process is not successful, the next step in problem resolution is for the FSSS to connect remotely and attempt to fix the problem. If this attempt fails, the next step is to swap the disk with on-site pre-configured spares. The last step is to send a FSSS engineer directly to the site to resolve the problem.

Organization

The FSSS organization is spearheaded by the IFS government COR and the FSSS contractor PM. The Operations Manager directs the global FSSS support effort and FSSS Operations centralized Command and Control (C^2) support center located at Sierra Vista, AZ.

Seven RSSAs augment, coordinate, and manage all IFS FSSS field operations. Five RSSAs are located within the continental United States: the Eastern Region in North Carolina, Southeastern Region in Georgia, Western Region in Washington State, Central Region in Texas, and USAIC in Arizona. Two regions are located overseas - the European Region in Germany and the Asian Region in Korea. The Asian and European RSSAs fall under the SEC Korean and European Software Support Offices (KSSO/ESSO), respectively.

RSSA engineers can rapidly deploy to support exercises and operational deployments. IFS FSSS on-site engineers provide daily Intelligence software support in over 30 locations worldwide.

Responsibilities

The FSSS organization is capable of expanding to meet additional software service support requirements as new Intelligence Fusion systems are added to the Army inventory. The FSSS primary duties for assigned systems include system administration and software support of the fielded software baselines, in accordance with standard government configuration control processes. FSSS provides on-site configuration control, as well as installing software baselines and applying approved software patches. FSSS engineers are qualified to perform all activities in the field to support the Army users needs. The government field software leader coordinates a Memorandum of Agreement (MOA) on an annual basis identifying all support agreements, including any new requirements that have been identified by the fielded unit. The MOA identifies the support services that will be provided and includes exercise support costs for the upcoming year.   The MOA also identifies any extended hours that the fielded unit is responsible to fund. The FSSS PM and Operations Manager receive their support requirements through written tasks and subtasks, as well as verbal and e-mail tasking.

The PM and Operations Manager are the direct interface with the government on all contractual tasking, obligations, reports, present and future planning efforts, and budget issues. They oversee and participate in the daily activities of the Operations Center, RSSAs, and on-site FSSS personnel.

Operations Center

The IFS global Operations Center, located in Sierra Vista, AZ, is operated and staffed by qualified technicians who have the background and technical knowedge to track and coordinate the operations of the RSSAs and unit-specific field locations. The Operations Center responsibilities include providing a daily FSSS operational status briefing to IFS systems maintainers and CECOM personnel, detailing worldwide software/support issues.

Regional Software Support Activity

The RSSA is a regional support concept developed to augment, coordinate, and manage all FSSS field operations. Each RSSA is supervised by a Regional Manager who reports directly to the FSSS PM in Sierra Vista, AZ. The Regional Manager provides administrative and technical support to all unit-level FSSS engineers within the region, supplements the dedicated engineers assigned to specific units, and coordinates and enforces policies of IFS.

Each RSSA is staffed by technical experts who are well versed in the operations and support requirements of their regional unit's missions. These engineers have expert system knowledge and can augment on-site FSSS engineers during exercises and contingency operations. To facilitate support, each RSSA engineer is issued a telephone and/or pager and has access to a commercial telephone and facsimile (FAX) machine. This allows the unit and/or Operations Center to contact FSSS engineers if a problem is encountered outside normal duty hours.

The RSSAs are strategically located worldwide to provide "help-desk type" telephonic assistance, emergency site response, on-call response to unit problems, periodic site visits to system locations, a central point for Software Problem Report (SPR) processing, exercise support, and assistance to unit-level FSSS engineers during periods of emergency absences. If necessary, FSSS engineers may be drawn from other RSSAs to augment exercise support or provide specific expertise for problem resolution.

Part II of this article, which will appear in the next edition of the "A/IEW Bulletin", will focus on the FSSS's major functions and IFS worldwide supported operations.

Written by Mr. William R. Walker, CECOM SEC IFS

Software Engineering Center's GUARDRAIL Branch (Part II)

The second and final part of this article will focus on the GUARDRAIL (GR) Branch's role in the development of the Aerial Common Sensor (ACS). These roles, although in support of the ACS program, demonstrate future responsibilities of SEC regarding participation in:

- Coordination/evaluation of competitive solicitations;

- Development of a Common Ground Station program;

- Integration of Ground Station components into the Common Ground Station approach built on the Modeling and Simulation (M&S) groundwork developed for ACS;

- Engineering and combat model development;

- System of System compliance with High-Level Architecture (HLA) and Object Oriented (OO) design;

- Unified Modeling Language (UML) and OO-based software developments;

- Coordination of, and participation in, effort and cost saving multi-service technical development partnerships; and

- Field user requirements documentation.

Competing-Primes Contract Solicitation

The ACS acquisition strategy has centered on several key components:

- Lifecycle cost;

- Simulation-based acquisition; and

- Contractor lifecycle support.

The ACS Broad Agency Announcement was let on 28 January 00 and subsequently awarded to the Raytheon, Northrop Grumman and Lockheed Martin teams in late April. The contractor teams will compete over an 18-month Concept Exploration Phase. At the macro level, the evaluation criteria for awarding the ACS contract to the winning team are:

- Total Ownership costs;

- Technical solution/operational capability;

- Software capability; and

- Past performance.

The SEC GR Branch is playing a key role in both the technical/operational and software capability evaluations, two areas where years of applying proven evaluation criteria have provided successful results, i.e., extremely competent, cost-effective and cooperative contractors, for GR programs. SEC will use the lessons learned from these previous evaluations in conducting a Software Capabilities Evaluation (SCE) on the ACS software procurement.

Modeling and Simulation

Tasking: In January, PM ACS tasked the ACS Software Integrated Product Team (S/W IPT) to develop a M&S Strategy for the ACS program. The approach was based on the "M&S Strategy on Simulation Based Acquisition" and its Army counterpart, "Simulation and Modeling for Acquisition, Requirements and Training (SMART)", as recommended by the office of the Assistant Secretary of the Army (Acquisition, Logistics & Technology).

SMART is a new systems acquisition paradigm that focuses on total system lifecycle, from requirements definition through system retirement. SMART is dependent upon DoD-wide collaboration, concurrent development, refined acquisition processes, and:

> "an advanced SMART systems engineering environment in which the application of formal methods and automation to support all system lifecycle activities simultaneously encourages software reuse and maximizes interoperability."
> SBA Functional Description – Version 1.1

ACS Software IPT Role: The ACS S/W IPT partnered with the Joint Precision Strike Demonstration (JPSD) Office for development of an ACS-specific Operational Environment reflecting threat lay-down for the year 2010. Each ACS contractor will develop an Operational Model, based on Engineering Analysis and Engineering Models, which will play in the ACS simulation environment at the JPSD facility. The SMART IPT developed key Measures of Effectiveness and Measures of Performance to help with the down selection process at the end of the Concept Exploration Phase.

A key underpinning of a SMART program is the use of a collaboration environment allowing a) integration of models and simulations across large geographical areas, and b) exchange and integration of data between models. The ACS S/W IPT has the lead role in collaboration environment user requirements development and is working directly with PM Signals Warfare, Program Executive Office Intelligence, Electronic Warfare and Sensors, and the CECOM Research and Development Engineering Center. One of the ACS S/W IPT's key deliverables will be a viable collaboration environment.

Ground Station components, having been removed from the ACS, PROPHET and other program budget lines, are being integrated into a common Ground Station approach. SEC is interested in playing a key role in integration activities, and can add value by building on the M&S groundwork developed on the ACS program. The ACS system will exist as a virtual prototype for several years before a physical prototype is developed. Thus, the SEC team would assume a role in the M&S area of the Ground Station program, and ensure that the Ground Station model is developed in parallel with the ACS virtual prototype.

Potential partners for engineering and combat model development are Intelligence & Information Warfare Directorate and other PMs who need to provide visibility to their system's capabilities that can then be included in Battle Lab Advanced Warfighter Experiments or other DoD 'war games'. Combat models have to be HLA-compliant and object-oriented to play within the Systems-of-Systems environments being developed under the umbrella of simulation-based acquisition. SEC believes such cooperative efforts will lead to mutual technical and operational benefits and cost-savings for all concerned.

Object-Oriented (OO) Analysis

Tasking: The GR Team saw the need for an OO analysis and design discipline on the ACS program and received support from PM ACS to move forward.

ACS Software IPT Role: Through analysis of the Signal Intelligence (SIGINT) Object Mode application, and reviews of the ACS Operational Requirements Document (ORD) and Concept of Operations (CONOPS), the team determined that the acquisition process required a more disciplined approach for system analysis. Object Oriented Analysis and Design (OOAD), and UML were subsequently introduced into the ACS

program. In partnership with the SIGINT, Overarching Technical, and Imagery Intelligence IPTs, the GR Team initiated integration of these new technologies into numerous GR applications and functions.

Potential Business Area for SEC: OOAD is a key technology of the future. SEC's plans to continue development of its OO core competency capability to its fullest potential will mean that SEC can provide high-demand services to its customer-base in this area, such as:

- OO requirements analysis and specification to reduce program rework and cost;

- OO system and software development, e.g., products developed by SEC would use the UML;

- Discipline in order to compete with contractor proposed systems; and

- In-depth analysis of contractor proposed OO designs.

Joint Development (Technology Insertion and Sharing)

Tasking: With the increased emphasis on joint operations between the services, a need was defined for increased sharing of information at the tactical level. Due to budgetary shortfalls that each of the DoD agencies faces, critical needs can only be partially satisfied, thus making sharing a desirable strategy.

ACS Software IPT Role: GR has been working with the Space and Naval Warfare (SPAWAR) Center as part of the Joint Development and Technology Insertion (JDTI) Working Group to avoid duplicative efforts and reinforce the definition of shared requirements. The working group consists of three basic elements:

- **Technology Insertion Subfunction:** There are various existing systems which can satisfy agency requirements if properly integrated. This subfunction allows GR to build a PC-based Common High Accuracy Location Systems (CHALS) processor for the Coast Guard operations, therefore providing the Navy/Coast Guard with a requirement that they were lacking - the Time Difference of Arrival (TDOA) capability.
- **Shared Development Subfunction:** This subfunction addresses needs that are shared by the services. In these cases the services have only partial solutions and, therefore, the tendency is to defer the pursuit of a solution until dollars are available.
- **Architecture Subfunction:** Includes the Joint Tactical SIGINT Architecture (JTSA) involvement to ensure that the JDTI is aware of any architectural constraints.

Potential Business Area for SEC: SEC has a wealth of capabilities that have been developed for the Army. The accomplishments achieved by SEC GR for the GUARDRAIL family of systems attests to the success and promise of results that can be expected in this area. Many of these would be of value to other services' programs and as such could provide the basis for a business strategy focused on resale of technology/capability to other services. SEC would rely on its current technical competency, and on its priority thrust for expanding its marketing and sales umbrella, to identify candidate programs that would benefit by this thrust.

Warfighter Needs Analysis

Tasking: The GR team recognized a need to update Warfighter requirements (as per the October 1997 ACS ORD) with inputs from both GRCS and ARL system users and intelligence consumers. The ACS S/W IPT proposed using Quality Function Deployment (QFD), an industry-developed customer needs analysis technique. The Training & Doctrine Command (TRADOC) System Manager (TSM) for ACS, and PM ACS, accepted the proposal and the IPT initiated the process.

ACS Software IPT Role: The ACS S/W IPT developed the QFD approach and question sets, and members of TRADOC managed the visit schedule. All interviews were tape recorded, transcribed and entered into a requirement matrix. Members of the GR team integrated the QFD findings into suggested updates and enhancements to the ORD at the request of the TSM for the Unmanned Aerial Vehicle (UAV) program.

Potential Business Area for SEC: Requirements development has serious implications for any program. SEC will apply its QFD competency (e.g., user requirement analysis) to be integrated with its Unified Modeling Approach to support TRADOC in the development of future ORDs. The requirements documents would be integrated with OOAD tools and provide traceability throughout a program's lifecycle.

Conclusion

With a vast array of talents at the ready, the SEC GR Branch has kept the GUARDRAIL platform a viable asset in the U.S. Intelligence Community for the past three decades. They will continue to put this level of effort into the ACS program as well as assume the future lead roles mentioned throughout this article.

Written by Mr. Ray Santiago and Mr. Larry Lashine, CECOM SEC, and Ms. Brenda Klafter, ILEX Systems

SEC, British MoD Meet to Discuss AN/APR-39 Support

Leadership from the SEC A/IEW Division and Electronic Combat Branch met with representatives from the United Kingdom Ministry of Defense (MoD) and Air Warfare Centre (AWC) on 8 and 9 May to discuss U.S. support for the AN/APR-39A(V)4 Radar Signal Detecting Set. The meeting was part of the United Kingdom's ongoing integration of the AH-64 attack helicopter into their arsenal. While many of the platforms will host a British-developed ASE suite, several aircraft will be equipped with the –A(V)4 and require the same reprogramming support as its American counterpart.

The meetings began with Wing Commander Chris Hull, EW Operations Wing of the AWC, providing an overview presentation of the Operations Wing organization and function. Mr. Joseph Ingrao, Deputy Chief of the A/IEW Division, followed Wing Commander Hull with the opening half of the SEC's overview of the AN/APR-39 series reprogramming process. His presentation provided a synopsis of the organization and processes behind the support that SEC would provide to the United Kingdom's AH-64 program. Mr. Peter

McGrew, a Senior Threat Analyst from the ARAT-TA and SRI International, provided the second half of the A/IEW briefing with an outline of the reprogramming-related threat analysis process, and the products the United Kingdom could expect to receive from both the ARAT-TA and SEC.

Following the morning briefings, Mr. Ingrao and Mr. Gary Clerie, ECB Chief, gave the United Kingdom contingent a tour of the Army's reprogramming facility in CEL2, Building 1210. The group received several demonstrations during the tour including an overview of the MDS Generator Tool (previously purchased by the UK and scheduled for update in late-summer 2000) and the Track File Viewer Program. Resident engineers answered questions on these two tools' functionality, as well as other systems and test configurations in the laboratory.

Mr. Pete McGrew explains the reprogramming process to MoD and AWC visitors as Mr. Gary Clerie looks on.

The second day of the meeting centered on coordination of the support to be provided to the United Kingdom. When the meeting adjourned, tentative plans were laid out for the ECB and the UK to do a collaborative effort for MDS programming and testing. The initial effort will produce two training MDSs for the British AH-64s, with potential growth into operational MDSs. These plans will be reviewed by both countries' respective Ministry and Department of Defense and efforts may begin as early as late Fall of this year.

Upon leaving Fort Monmouth, the visitors traveled to Huntsville, Alabama, to meet with PEO Aviation representatives.

{Note: Joining Wing Commander Hull were LTC Kris Chafer (Director Attack Helicopter, Ministry of Defense), Squadron Commander Trevor Newby (EW Operations Squadron, AWC), Flight Commander Lawrence Boardman (Future Systems Fight, AWC), WO Martin Coleman (Future Systems Flight [Rotary], AWC), and CAPT Joe Kerr (USAF Exchange Officer).}

The Art and Science of Jamming (Part II)

Pulse Doppler and Adaptive PFM

These technologies must be examined together to understand their effect on deception jamming. Pulse Doppler processing provides several benefits to target tracking radars: it provides very accurate target velocity, allows targets to be tracked in ground clutter, and it allows targets to be tracked in noisy environments (natural background noise or from a noise jammer). The function of Pulse Doppler radars is very dependent on the pulse repetition interval (PRI). Pulse Doppler processing favors the use of constant PRIs, but problems arise for the radars if only one PRI is used. The first problem is that a particular PRI is limited in the velocities it can distinguish. As the PRI gets lower, the range of velocities it can distinguish increases. From the aspect of distinguishing target velocities, the lower the PRI, the better. However, this leads to another problem. As the PRI drops, the range at which the target can be unambiguously distinguished is reduced. The shortened interval

does not allow a pulse to travel very far before another is emitted behind it. When that occurs, the radar does not know which pulse corresponds to the target return, so the range and velocity are working against each other. As one is clarified, the other becomes ambiguous. Radar designers overcame this problem by periodically switching from one constant PRI to another, which is known as a dwell/switch PFM. The combination of PRIs eliminates the velocity and range ambiguities. Herein lies the problem for deception jammers. Recall that the radar signal must be predictable for the jamming to be effective. The dwell/switch PFM changes the PRI at irregular intervals and maintains no sequence of PRIs. Typically, Pulse Doppler radars are software controlled and can have hundreds of PRIs from which to choose. The difficulty in jamming the radar is clear. This technology introduces randomness in the radar signal that cannot be easily overcome.

Phased Array Antennas

Older radar scanned targets by mechanically moving the radar antenna. Naturally, there is a limit on how rapidly the antenna can be slewed to follow a target or to scan several targets sequentially. The phased array antenna steers its beam electronically by transmitting from many antenna elements in a precisely timed and ordered fashion. The resulting interference pattern of the antenna elements generates a radar pulse in the desired direction. Phased arrays are able to point their beams in any direction within the antenna's view within microseconds. The phased array gives the radar enormous flexibility in scanning. It is able to track several targets simultaneously on a time-shared basis and use the remaining dead time to scan for new targets. The time-sharing and rapid beam pointing produce a very irregular scan pattern. This creates an additional difficulty for deception jamming. The radar beam is pointed at the target (and hence, the jammer) sporadically and for only a very short time. The jammer may not be able to respond to the radar signal pulses before the radar beam moves to a different location. This injects another random element that inhibits deception jamming.

When combined, these radar techniques are a tremendous challenge for EW engineers. Air defense systems incorporating the technology have been fielded for the past 15 years and are readily available for export. The salvation for the U.S. has been that these systems are rather expensive and none of its enemies have been able to afford them yet. However, the warning is clear: the availability of modern air defenses will lead inevitably to the U.S. armed forces facing them in combat. The U.S. has never encountered a modern air defense environment, but events in Kosovo indicate that 30 year-old systems still pose a challenge to U.S. operations. If the Army's ASE philosophy is to remain intact, new concepts and techniques for decoying and jamming radar-controlled air defenses are needed. Although the latest jammers have had some success in combining techniques to present more realistic signal (e.g. the jamming signal's velocity information has a corresponding change in range information), repeater jamming has reached its apex of effectiveness. A concern is that there is nothing on the horizon that will take over its role in the ASE philosophy. Unless research and development efforts produce new approaches to defeating radar-controlled defenses, the ability of Army aviation assets to jam RF threats will become increasingly difficult.

Written by Mr. Carl Brunner, SRI International, ARAT-TA

Notes to the Field

For Your Bookshelf

You won't find it in your local bookstore, but it may just be one of the most valuable books an EWO can add to his or her library. This book is the "Electronic Warfare Officer's Guide to the Reprogramming of Radar Signal Detecting Sets", produced by the A/IEW's Electronic Combat Branch.

The guide is a "how to" manual designed in a series of appendices, each covering particular blocks of information. The appendix titles are:

- *Frequently Asked Questions (FAQs)*

- *Aircraft Survivability*

- *Acronyms*

- *Glossary*

- *References*

- *Reprogramming 101* (An introduction to the ARAT, its key members and their functions, as well as an overview of the reprogramming process.)

- *Reaching the Information* (Step-by-step procedures for using the ARAT Communications Infrastructure.)

- *Finding the Information* (An overview of two sources for reprogramming-related information - the Multi-Service Electronic Warfare Bulletin Board System (MSEWBBS) and the ARAT Web.)

- *Using the Information* (Procedures on how to use the Memory Loader/Verifier [MLV] to install a Mission Data Set into your reprogrammable ASE.)

- *Messages* (Various message formats by which pertinent reprogramming information will be passed over AUTODIN and probably the Defense Message System once it is fully implemented).

- *Aviation Target Sensing Systems*

- *Mission Data Set Availability*

- *Who Can Help*

- *Forms*

- *ARAT and Systems POCs*

If you would like a copy, please forward your name and mailing address to:

Commander
U.S. Army Communications-Electronics Command
(ATTN: AMSEL-SE-WS-AI-EC)
Building 1210, Rittko Avenue
Fort Monmouth, NJ 07703-5207

AN/APR-39 RSDS Grounding

The following is extracted from "PS Magazine" Issue # 525, August 1996, page 35:

"The line replaceable units (LRUs) that make up an aircraft's AN/APR-39 radar signal detecting set must be grounded. All too often the ground is not established when an LRU is installed or maintained when a component is replaced.

A good ground should allow no more than 2.5 milliohms resistance. Higher resistance generates false detections/warnings.

If the resistance is not low enough, and you've installed the ground correctly, the ground strap is the problem. Replace it with ground strap, NSN 6150-00-163-1231."

(Editor's note: Other "PS Magazine" articles dealing with the AN/APR-39 RSDS can be found in issues #523 [page 46], #525 [page 36], #527 [page 48], # 529 [pages 36-37], #544 [page 49], and #553 [page 47].)

ATTENTION AN/APR-39A(V)1 USERS!

The current Operational Flight Program (OFP) for the AN/APR-39A(V)1 is Version *23.9*. All current Mission Data Sets (MDS) and all future MDS are designed to function with OFP 23.9, not earlier versions of the OFP! However, MDS designed to function with older OFP versions will operate with OFP 23.9. It is highly recommended that your systems have OFP 23.9 installed. If you are operating with any other version, please contact your local CECOM LAR or the ECB at 732-532-0065.
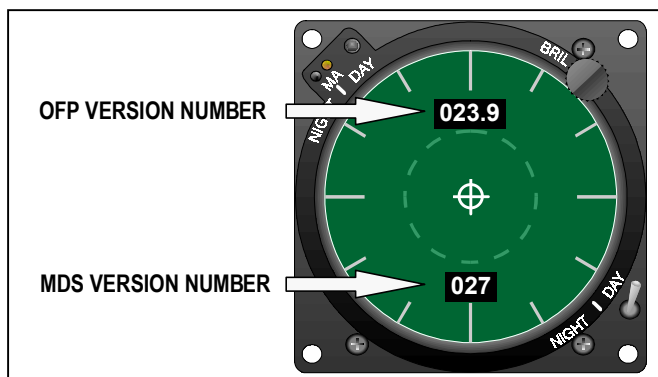
For Your Information

Coming Events!

Event	Location	Date(s)
Intelligence/Electronic Warfare Conference	*Ft. Monmouth, NJ*	**15-16 August 2000**
37th Annual AOC International Symposium & Convention	**Las Vegas, NV**	**1-5 October 2000**
AUSA Annual Meeting	*Washington, DC*	**16-18 October 2000**
AAAA Annual Convention	*Charlotte, NC*	**4-7 April 2001**

Now Available on the Web

All 19 previous issues of the "ARAT Bulletin" and the "A/IEW Bulletin" are now available on the ARAT web site. The issues are available in HTML format for on-line viewing, as well as in PDF and MS Word 97 format for viewing and downloading.

Future issues will also be posted on the site and in the same format. You are encouraged to download any issue (or issues) for local reproduction and distribution within your agency. The ARAT web site can be accessed at http://arat.iew. sed.monmouth army.mil/, or from a link on the A/IEW web site at http://www.iew.sed .monmouth.army.mil/.

Help Us Help You

If you are moving, have moved, or your address is listed incorrectly on the mailing envelope, please call Ms. Tara Hurden at (732) 532-5319, DSN 992-5319; or email at hurden@mail1.monmouth.army .mil with the correct address. Many Bulletins are returned for incorrect addresses and unknown addressees. We would like to reduce the amount of returned mail and ensure that all of our customers receive the latest issue of the "A/IEW Bulletin". Thank you for your support.

ARAT Rapid Reprogramming Communications Infrastructure Laboratory (R^2CIL)

Telephone:
#1 (732) 532-9395
DSN: 992-9395
#2 (732) 532-9392
DSN: 992-9392
#3 (732) 532-1859
DSN: 992-1859
#4 (732) 532-5319
DSN: 992-5319 -or-
(732) 530-7766 ext.: 318 or 324*
* Answering machine/voice mail option available at this number for after-hour messages*

Email:
Unclassified:
webmaster@arat.iew.sed. monmouth. army.mil
SIPRNET:
webmaster@arat.army.smil.mil

ATTENTION ELECTRONIC WARFARE OFFICERS!

Electronic Warfare Officers requiring Memory Loader/Verifier (MLV) reprogramming kits should contact either Ms. Fanny Leung-Ng (DSN: 312-992-1859/ CML: 732-532-1859) (leungf@mail1.monmouth.army.mil) or Ms. Tara Hurden (DSN: 312-992-5319/ CML: 732-532-5319) (hurden@mail1.monmouth.army.mil) or fax your requests to DSN: 312-992-8287/5238 or CML: (732) 532-8287/5238.

The A/IEW Community Key Points of Contact

Agency	Name/e-mail	Comm/DSN	Fax Number
Chief, A/IEW Division	Dr. Ihor Hapij hapij@mail1.monmouth.army.mil	(732) 532-8199 DSN 992-8199	(732) 532-8287 DSN 992-8287
Deputy Chief, A/IEW Division	Mr. Joseph Ingrao ingrao@mail1.monmouth.army.mil	(732) 532-1337 DSN 992-1337	(732) 532-5238 DSN 992-5238
Avionics Branch	Mr. Edward Wuysick wuyscik@mail1.monmouth.army.mil	(732) 427-3924 DSN 997-3924	(732) 427-3923 DSN 997-3923
Electronic Combat Branch ARAT-SE (CECOM)	Mr. Gary Clerie clerie@mail1.monmouth.army.mil	(732) 532-0065 DSN 992-0065	(732) 532-5238 DSN 992-5238
GUARDRAIL Branch	Mr. Raymond Santiago santiago@mail1.monmouth.army.mil	(732) 532-1420 DSN 992-1420	(732) 532-8287 DSN 992-8287
Intelligence Fusion Branch	Mr. William Walker walker@huachuca-emh27.army.mil	(520) 538-6188 DSN 879-6188	(520) 538-7673 DSN 879-7673
SIGINT Branch	Mr. Robert Hart hartR@mail1.monmouth.army.mil	(732) 532-6253 DSN 992-6253	(732) 532-8287 DSN 992-8287
Sensors Branch	Mr. Frank Toth toth@mail1.monmouth.army.mil	(732) 532-8353 DSN 992-8353	(732) 532-8287 DSN 992-8287
ARAT-TA (Eglin AFB)	Mr. Norman Svarrer svarrer@eglin.af.mil	(850) 882-8899 DSN 872-8899	(850) 882-9609 (C) -4268 (U) DSN 872-9609 (C) -4268 (U)
ARAT-TA (Kelly AFB)	SSG Edward L. Wiggins elwiggi@afwic.osis.gov	(210) 977-2021 DSN 969-2021	(210) 977-2145 DSN 969-2021
ARAT-SC (Fort Rucker)	Mr. George Hall hallg@rucker.army.mil	DSN 558-9334	DSN 558-1165